

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A paint system comprising a paint supply station, a paint supply channel downstream of the paint supply station, the paint supply channel having a number of supply nodes, a paint return channel upstream of the paint supply station, the paint return channel having a number of return nodes, and a number of paint circulation lines, each paint circulation line including a coupling for connecting a paint output nozzle assembly thereto, each paint circulation line being positioned downstream of the paint supply channel at a corresponding supply node, each paint circulation line being positioned upstream of the paint return channel at a corresponding return node, each of said paint circulation lines further comprising a flow induced pressure generating portion including one or more lengths of coiled tubing for developing a differential pressure in the paint circulation line, the differential pressure being proportional to the magnitude of paint flow therein, each of the pressure generating portions being selected to generate sufficient differential pressure sufficient to provide an operative pressure differential at a corresponding paint output nozzle assembly, wherein each paint circulation line is substantially free of any component of sufficient size to cause accumulation of settled solids from a paint mixture to cause pressure changes to a degree requiring that the system be recalibrated or to cause settled solids to be deposited on a painted surface to a degree requiring remedial repair.
2. (Cancelled)
3. (Cancelled)
4. (Currently Amended) A system as defined in claim 1 wherein the paint output nozzle assembly ~~[[is]]~~ includes a paint spray gun.

5. (Original) A system as defined in claim 1 wherein the coupling is a colour change valve, or a manual flow through regulator with or without a quick disconnect.
6. (Currently Amended) A paint system comprising a paint supply station, a paint supply channel downstream of the paint supply station, the paint supply channel having a number of supply nodes, a paint return channel upstream of the paint supply station, the paint return channel having a number of return nodes and a number of paint circulation lines, each paint circulation line including a coupling for connecting a paint output nozzle assembly thereto, each paint circulation line being positioned downstream of the paint supply channel at a corresponding supply node, each paint circulation line being positioned upstream of the paint return channel at a corresponding return node, each of said paint circulation lines further comprising a flow induced pressure generating portion including one or more lengths of coiled tubing for developing a differential pressure in the paint circulation line, the differential pressure being proportional to the magnitude of paint flow therein, each of the pressure generating portions being selected to generate sufficient differential pressure sufficient to provide an operative pressure differential at a corresponding paint output nozzle assembly, wherein the pressure differential of all paint circulation lines is such that the design flow rate in every paint circulation line is substantially obtained in a stable and robust fashion, wherein changes in viscosity, provided the flow stays in the laminar flow zone, will cause the design flow rates in each and every paint circulation line to be substantially maintained.
7. (Currently Amended) A paint circulation system for supplying a paint mixture to a paint booth in a manufacturing operation, the paint circulation system comprising a number of paint drop lines supplying paint to a number of paint spray gun assemblies, each paint drop line including at least one colour change valve for connecting at least one paint spray gun assembly thereto, each paint spray gun assembly being operative to spray a paint mixture received from the corresponding paint drop line at an operative flow rate, each

paint drop line being positioned downstream of a paint supply node and upstream of a corresponding paint return node, each of said paint drop lines further comprising a means for generating differential pressure according to the operative flow rate, the means for generating differential pressure including one or more lengths of coiled tubing wherein each paint drop line is substantially free of any component or dead spot of sufficient size to cause accumulation of settled solids from a paint mixture to cause pressure changes to a degree requiring that the system be recalibrated or to cause settled solids to be deposited on a painted surface to a degree requiring remedial repair thereof.

8. (Currently Amended) A paint circulation system for supplying a paint mixture to a paint booth in an automobile manufacturing operation, the paint circulation system comprising a number of paint drop lines, each including a colour change valve for connecting at least one paint spray gun assembly thereto, each paint drop line being positioned downstream of a paint supply channel and upstream of a paint return channel, each of said paint drop lines further comprising a means for generating differential pressure according to an operative flow rate for the corresponding at least one spray gun assembly, the means for generating differential pressure including one or more lengths of coiled tubing, wherein each paint drop line is substantially free of any component or dead spot of sufficient size to cause accumulation of settled solids from a paint mixture to cause pressure changes to a degree requiring that the system be recalibrated or to cause settled solids to be deposited on a painted surface to a degree requiring remedial repair thereof, wherein each paint drop line is free of pressure regulators, pressure reducing valves, pressure gauge assemblies, tees, standpipes, isolation valves, isolation diaphragms, or a combination thereof.
9. (Currently Amended) A paint circulation system for supplying a paint mixture to a paint booth in a manufacturing operation, the paint circulation system comprising a number of paint drop lines, each including a colour change valve for connecting a paint spray gun assembly thereto, each paint drop line being positioned downstream of a paint supply node and upstream of a paint return node, each of said paint drop lines further comprising a

means for generating differential pressure according to a magnitude of paint flowing therein and under low shear flow conditions, the means for generating differential pressure including one or more lengths of coiled tubing, wherein each paint drop line is substantially free of one or more sources of shear induced damage to additives contained in a paint mixture resulting in inconsistencies in a painted surface to a degree requiring remedial repair thereof.

10-12. (Cancelled)

13. (Original) A system as defined in claim 1 wherein the differential pressure in each paint circulation line is produced entirely by a combination of differential sub-pressures including a first sub-pressure produced by the flow induced pressure generating portion, a second sub-pressure produced by paint circulation line and the coupling and without a pressure regulator, or pressure reducing valve or a pressure gauge assembly or a combination thereof.

14. (Currently Amended) A paint circulation system for a painting line, comprising a supply channel, a return channel and a plurality of drop lines downstream of the supply channel and upstream of the return channel, and control means located in each drop line for controlling a flow rate of paint through each drop line, the control means including one or more lengths of coiled tubing, wherein the control means is operative to adjust the flow rate according to a flow controlling pressure differential, and wherein the flow controlling pressure differential is the pressure differential across the drop line between the supply channel and the return channel.

15. (Currently Amended) A paint circulation system for a painting line, comprising a supply channel, a return channel and a plurality of drop lines downstream of the supply channel and upstream of the return channel, and control means located in each drop line for controlling a flow rate of paint through each drop line, the control means including one or

more lengths of coiled tubing, wherein the control means is operative to adjust the flow rate according to a flow controlling pressure differential, and wherein the flow controlling pressure differential is the pressure differential across the drop line between the supply channel and the return channel, wherein changes to viscosity in the paint do not result in changes to the system requiring recalibration between paint drop lines.

16. (Currently Amended) A paint circulation system for a painting line, comprising a supply channel, a return channel and a plurality of drop lines downstream of the supply channel and upstream of the return channel, a paint pump means for circulating paint through the supply channel, the drop lines and the return channel with a corresponding flow rate through each drop line, and means for establishing a flow controlling pressure differential between the supply channel and the return channel in each drop line which is directly proportional to the paint flow rate, the means for establishing a flow controlling pressure differential including one or lengths of coiled tubing in each of the drop lines, wherein a change in the flow controlling pressure differential in a given drop line causes a corresponding proportional change in the paint flow rate through the given drop line.
17. (Currently Amended) A paint circulation system for an automotive painting line, comprising a supply channel, a return channel and a plurality of drop lines downstream of the supply channel and upstream of the return channel, a paint pump means for circulating paint through the supply channel, the return channel and at a drop line paint flow rate through the drop lines, and means for limiting changes to the drop line flow rate in a given drop line to within a proportional change in a flow controlling pressure differential in the corresponding drop line between the supply channel and the return channel, the means for limiting changes including one or more lengths of coiled tubing located in each drop line.
- 18-20. (Cancelled)

21. (NEW) A system as defined in claim 1, wherein the lengths of coiled tubing are arranged in series or in parallel in a corresponding paint circulation line.
22. (NEW) A system as defined in claim 1, further comprising an output nozzle assembly in fluid communication with the coupling of each paint circulation line, the output nozzle assembly including one or more paint spray guns, flow meters, air operated pressure regulators, servo driven flow controllers and/or flushing systems.
23. (NEW) A system as defined in claim 1, wherein the length of coiled tubing has one or more predetermined coil parameters, including inner tube diameter, coil diameter, coil length, and coil pitch, one or more of which being selected according to a predetermined flow induced differential pressure.
24. (NEW) A system as defined in claim 1, wherein one or more than one length of coiled tubing has an inner tube diameter ranging from about 1/8 inch to about 1/2 inch, a wall thickness ranging from about 0.020 inch to about 0.065 inch, a coil diameter ranging from about 1/2 inch to about 12 inches and a coil pitch ranging from about 1/8 inch to about 1 inch.
25. (NEW) A system as defined in claim 1, wherein each length of coiled tubing is formed from stainless steel materials.
26. (NEW) A system as defined in claim 25, wherein the length of coiled tubing has an inner tube diameter of 1/4 inch, a length of about 20 inches, a wall thickness of 0.035 inch, a coil diameter of about 4 inches, a coil pitch of 1/2 inch, and an overall tube length of about 20 inches.
27. (NEW) A system as defined in claim 6, wherein a plurality of lengths of coiled tubing are arranged in series or in parallel in a corresponding paint circulation line, further comprising

an output nozzle assembly attached to the coupling, the output nozzle assembly further comprising one or more paint spray guns, flow meters, air operated pressure regulators, servo driven flow controllers and flushing systems, the length of coiled tubing having one or more predetermined coil parameters, including inner tube diameter, coil diameter, coil length, and coil pitch, one or more of which being selected according to a predetermined flow induced differential pressure, the length of coiled tubing having an inner tube diameter ranging from about 1/8 inch to about 1/2 inch, a wall thickness ranging from about 0.020 inch to about 0.065 inch, a coil diameter ranging from about 1/2 inch to about 12 inches and a coil pitch ranging from about 1/8 inch to about 1 inch.

28. (NEW) A system as defined in claim 7, wherein the lengths of coiled tubing being arranged in series or in parallel in a corresponding paint drop line, each length of coiled tubing being formed from stainless steel materials, each the length of coiled tubing having an inner tube diameter of 1/4 inch, with length of about 20 inches, a wall thickness of 0.035 inch, a coil diameter of about 4 inches, a coil pitch of 1/2 inch, and an overall tube length of about 20 inches.
29. (NEW) A system as defined in claim 8, wherein a plurality of lengths of coiled tubing are arranged in series or in parallel in a corresponding paint drop line.
30. (NEW) A system as defined in claim 8, wherein the length of coiled tubing has one or more predetermined coil parameters, including inner tube diameter, coil diameter, coil length, and coil pitch, one or more of which being selected according to a predetermined flow induced differential pressure.
31. (NEW) A system as defined in claim 8, wherein each length of coiled tubing has an inner tube diameter ranging from about 1/8 inch to about 1/2 inch, a wall thickness ranging from about 0.020 inch to about 0.065 inch, a coil diameter ranging from about 1/2 inch to about 12 inches and a coil pitch ranging from about 1/8 inch to about 1 inch.

32. (NEW) A system as defined in claim 8, wherein each length of coiled tubing is formed from stainless steel materials.
33. (NEW) A system as defined in claim 8, wherein the length of coiled tubing has an inner tube diameter of $\frac{1}{4}$ inch, with length of about 20 inches, a wall thickness of 0.035 inch, a coil diameter of about 4 inches, a coil pitch of $\frac{1}{2}$ inch, and an overall tube length of about 20 inches.
34. (NEW) A system as defined in claim 9, wherein a plurality of the lengths of coiled tubing being formed from stainless steel materials and arranged in series or in parallel in a corresponding paint drop line, one or more than one length of coiled tubing having an inner tube diameter ranging from about $\frac{1}{8}$ inch to about $\frac{1}{2}$ inch, a wall thickness ranging from about 0.020 inch to about 0.065 inch, a coil diameter ranging from about 0.5 inch to about 12 inches and a coil pitch ranging from about $\frac{1}{8}$ inch to about 1 inch.
35. (NEW) A system as defined in claim 14, further comprising a paint output nozzle assembly coupled to each drop line, a plurality of the lengths of coiled tubing being arranged in series or in parallel in a corresponding paint drop line, the output nozzle assembly including one or more paint spray guns, flow meters, air operated pressure regulators, servo driven flow controllers and flushing systems, one or more than one length of coiled tubing having an inner tube diameter ranging from about $\frac{1}{8}$ inch to about $\frac{1}{2}$ inch, a wall thickness ranging from about 0.020 inch to about 0.065 inch, a coil diameter ranging from about $\frac{1}{2}$ inch to about 12 inches and a coil pitch ranging from about $\frac{1}{8}$ inch to about 1 inch.
36. (NEW) A system as defined in claim 15, further comprising a paint output nozzle assembly coupled to each of the paint drop lines, a plurality of the lengths of coiled tubing being arranged in series or in parallel in a corresponding paint circulation line, the output nozzle

assembly including one or more paint spray guns, flow meters, air operated pressure regulators, servo driven flow controllers and flushing systems, the length of coiled tubing having one or more predetermined coil parameters, including inner tube diameter, coil diameter, coil length, and coil pitch, one or more of which being selected according to a predetermined flow induced differential pressure, one or more than one length of coiled tubing having an inner tube diameter ranging from about 1/8 inch to about 1/2 inch, a wall thickness ranging from about 0.020 inch to about 0.065 inch, a coil diameter ranging from about 1/2 inch to about 12 inches and a coil pitch ranging from about 1/8 inch to about 1 inch, each length of coiled tubing is formed from stainless steel materials.

37. (NEW) A system as defined in claim 16, further comprising a paint output nozzle assembly coupled to each of the drop lines, the lengths of coiled tubing being arranged in series or in parallel in a corresponding paint drop line, each length of coiled tubing having an inner tube diameter, coil diameter, a coil length, and a coil pitch, one or more of which being selected according to a predetermined flow induced differential pressure, one or more than one of the lengths of coiled tubing having an inner tube diameter ranging from about 1/8 inch to about 1/2 inch, a wall thickness ranging from about 0.020 inch to about 0.065 inch, a coil diameter ranging from about 1/2 inch to about 12 inches and a coil pitch ranging from about 1/8 inch to about 1 inch.
38. (NEW) A system as defined in claim 17, further comprising a paint output nozzle assembly coupled to each of the drop lines.
39. (NEW) A system as defined in claim 17, wherein the lengths of coiled tubing are arranged in series or in parallel in a corresponding paint drop line.
40. (NEW) A system as defined in claim 17, wherein each length of coiled tubing has an inner tube diameter, coil diameter, a coil length, and a coil pitch, one or more of which being selected according to a predetermined flow induced differential pressure.

41. (NEW) A system as defined in claim 17, wherein one or more than one length of coiled tubing has an inner tube diameter ranging from about 1/8 inch to about 1/2 inch, a wall thickness ranging from about 0.020 inch to about 0.065 inch, a coil diameter ranging from about 1/2 inch to about 12 inches and a coil pitch ranging from about 1/8 inch to about 1 inch.
42. (NEW) A system as defined in claim 17, wherein each length of coiled tubing is formed from stainless steel materials.
43. (NEW) A system as defined in claim 17, wherein the length of coiled tubing has an inner tube diameter of 1/4 inch, a length of about 20 inches, a wall thickness of 0.035 inch, a coil diameter of about 4 inches, a coil pitch of 1/2 inch, and an overall tube length of about 20 inches.